

ABSTRACT

Water tolerant Lewis acids are used in a process for the preparation of alkylene glycols by catalytic hydration of the corresponding alkylene oxide. The water tolerant Lewis acids can be a metal salt of a non-coordinating or weakly coordinating anion and a Group IIIB, rare earth or lanthanide, actinide or Group IVB cation. Optionally, carbon oxide may also be present. Examples of such water tolerant Lewis acids are scandium triflate, europium triflate, hafnium triflate, yttrium triflate, lanthanum triflate and ytterbium triflate. The catalyst may contain a coordinating anion instead, examples of which are scandium sulfate $[\text{Sc}_2(\text{SO}_4)_3]$, scandium chloride $[\text{ScCl}_3]$, scandium acetate $[\text{Sc}(\text{OAc})_3]$ and scandium nitrate $[\text{Sc}(\text{NO}_3)_3]$. The catalysts may also contain both a non-coordinating or weakly coordinating anion and a coordinating anion, examples of which are scandium triflate sulfate $[\text{Sc}(\text{CF}_3\text{SO}_3)(\text{SO}_4)]$, scandium triflate chloride $[\text{Sc}(\text{CF}_3\text{SO}_3)_2\text{Cl}]$, scandium triflate acetate $[\text{Sc}(\text{CF}_3\text{SO}_3)_2(\text{OAc})]$ and scandium triflate nitrate $[\text{Sc}(\text{CF}_3\text{SO}_3)_2(\text{NO}_3)]$.